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A Catalogue of the Poisonous Plants of Iowa

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A CATALOGUE OF THE POISONOUS PLANTS OF IOWA.

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For a number of years we have given a course of lectures on plants poisonous and injurious to live stock to the veterinary students of the Iowa State College.

From stockmen and farmers in various parts of the state we frequently receive queries in regard to poisonous plants. In some cases the queries are accompanied with specimens. We are often asked to give more detailed information. In many cases, however, the evidence of poisoning is not proven; certain weeds are found in a pasture and the farmer supposes that they may be responsible for the death of animals.

The literature on the subject is quite meager so far as the plants of Iowa are concerned. The government has published several papers dealing with this subject, of these papers I may mention those by Chesnut[1], Chesnut and Wilcox[2], Wilcox[3], and Nelson[4]. Other writers on the same subject are O'Gara[5], Kennedy[6], Peters, Slade & Avery[7], Glover[8], Crawford[9], Heald & Peters[10], White[11], Johnson[12], Bessey[13], Rusby[14], Guttenberg[15], Pammel[16], Mills-

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2. The Stock Poisoning plants in Montana, Bull. Div. Bot. U. S. Dept. Agr. 26:150, pl. 36.
3. Rep. Bu. An. Ind. 17:91-121, pl. 32.
4. Feeding Wild Plants to Sheep, Rep. Bu. An. Ind. 15:421-425.
5. Rep. Nebr. Agr. Expt. Sta. 16:14-84, f. 13.
6. Bull. Nev. Agr. Expt. Sta. 51:57, pl. 26.
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8. Bull. Col. Agr. Expt. Sta. 113:24, pl. 8.
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10. Ergot and Ergotism, Press Bull. Nebr. Agr. Expt. Sta. 24, f. 3.
11. Dermatitis Venenata, An Account of the Action of External Irritants upon the Skin, 216:1887.
12. A Manual of the Medical Botany of N. Amer. p. 292, pl. 9, f. 160.
13. Bull. Dept. Bot. 1884. Proc. Soc. Prom. Agr. Sci. 23:35-41.
14. Poisonous Plants of the Vicinity of New York City, 19.
15. Poisonous Plants which Grow in and around Erie, 21:25.
16. Bull. Ia. Agr. Expt. Sta. 70:423-448. Poisoning from Cowbane, Bull. Ia. Agr. Expt. Sta. 28:215-225, f. 5.

paugh[17], Coville[18], Peck[19], J. U. & C. G. Lloyd[20], Stebler & Schroeter[21], Schaffner[22], R. Schimpfky[23], and Winslow[24].

In the sequence given in the following list we have followed the Engler and Prantl die Natuerlichen Pflanzen Familien.

EUTHALLOPHYTA. Schizophyta.

SCHIZOMYCETES.

Bacteria produce disease in two ways:—*First*, as parasites when they derive their nourishment from the living animal; in this case they may cause embolism as in the case of Bacillus anthracis or toxaemia as in diphtheria bacillus; or they may produce within the body products that are poisonous. The tetanus bacillus though parasitic produces powerful poisons that when injected even in minute doses cause a fatal termination, producing all the symptoms found in animals having the disease. *Second.* many saprophytic bacteria produce poisonous substances, especially such as occur in putrid flesh, fish, and other decaying substances. The list of such organism is a long one and cannot be given in this conection.

SCHIZOPHYCEAE. OSCILLATORIACEAE.

1. Oscillaria.

Several species in the state, probably somewhat injurious.

NOSTOCACAE.

2. Nostoc caeruleum, Lyngb.
3. N. muscorum, Ag.
4. N. commune, Vauch.

Dr. J. C. Arthur some years ago thought that one of the common blue-green algae, a species of nostoc, found in lakes in Northern Iowa and Southern Minnesota, was poisonous. Its poisonous nature was not conclusively demonstrated. These algae have been suspected in other parts of the world. Mr. George Francis[1] calls attention to the Nodularia spumigena occurring in a fresh water lake in Australia. Thirty ounces of a scum fed to sheep produced death. It is also poisonous to horses, dogs and pigs. Many of the algae of this group produce very disagreeable odors when decomposition occurs, and this plant is no exception to the rule. A few of these algae may be mentioned.

17. Medicinal Plants, 1:99, pl. 99. 2:100-180, pl. 180.
18. Poisonous Mushrooms, Cir. Div. Bot. 13:24.
19. Edible and Poisonous Fungi of New York, Ann. Rep. State Bot. of State of N. Y. 1896:105-248, pl. 43. Rep. State N. Y. Mus. Nat. Hist. 48.
20. Drugs and Medicines of N. Amer., Ranunculaceae 1:304, pl. 24, f. 105.
21. Beitrage zur Kenntniss der Matten und Weiden der Schweiz. Landw. Jahrb. d. Schweiz 5:141-225, pl. 20, f. 4.
22. Poisonous and other Injurious Plants of Ohio, Ohio Naturalist 4:16, 32, 69.
23. Deutschlands Wichtigste Giftgewächse in Wort und Bild nebst einerabh andlung ueber Pflanzengifte, pl. 27.
24. Veterinary Materia Medica and Therapeutics, 775.

1. Nature 18:11.

5. Anabaena flos-aquae, Breb.

6. Anabaena stagnalis, Kg. Both of these Anabaena are found floating on the water. In their decomposition they produce pig-pen odors.

Euphyceae.

CHLOROPHYCEAE.

VOLVOCACEAE.

Pandorina. Common in stagnant pools, especially in barnyards. The water is repulsive. Cattle will not drink it unless driven to do so. May be injurious. Volvox may be placed in the same category.

Eumycetes.

PHYCOMYCETES.

ZYGOMYCETES.

MUCORACEAE.

The species of this order are common; among them are:

7. Mucor mucedo, found on horse manure, and

8. Rhizopus nigricans, found on decaying organic substances.

There are two recorded pathogenic species.

9. Mucor corymbifer and

10. Mucor rhizopodiformis, but these have not been reported as occurring in this state.

11. Mucor stolonifer.

Common in state. Probably not pathogenic.

BASIDIOMYCETES.

Hemibasidii.

USTILAGINACEAE.

12. Ustilago maydis, D. C. Corn smut is supposed to be poisonous to cattle, but the evidence is not very conclusive.

13. Ustilago avenae, (Pers.) Jens. The common loose smut of oats is supposed to be injurious in large quantities, the same may be said of other smuts occurring upon cereals. Among these are barley smut (Ustilago hordei.), (U. nuda,) (U. tritici.)

14. Ustilago neglecta, Niessl.

Pigeon Grass smut is thought by many farmers in Iowa to cause poisoning, especially abortion. Prof. Power, formerly of the University of Wisconsin, found present in this smut a small quantity of ergotine.

TILLETIACEAE.

15. Tilletia foetens (B. & C.) Trel.

Stinking smut of wheat is not common in this state, but when it occurs in flour it causes bad odors. The spores give to the flour a dark color and make it unsalable.

Eubasidii.

PROTOBASIDIOMYCETES MELAMPSORACEAE.

16. Coleosporium solidaginis (Schw.) Thum.

Parasitic on golden rod and some other plants of the order. Common in the state. A number of horses in Black River Falls, Wisconsin, a few years

ago, became diseased, it is thought, by means of this rust. It may produce a form of Mycotic stomatitis.

PUCCINIACEAE.

17. Puccinia graminis, Pers.

Wheat and oat rust, especially the uredo stage, produces inflammation of the mucus membrane of the mouth and nose. The dust coming from the straw when grain is threshed often causes serious disturbances. Other rusts might be mentioned in this connection. like Puccinia coronata, Cda., the uredospores have an effect similar to that of the common grass rust.

AUTOBASIDIOMYCETES POLYPORACEAE.

18. Boletus felleus, Bull.

Probably occurs in the state. It has a bitter taste. Poisonous.

AGARICACEAE.

19. Lepiota morganii, Pk.

This fungus is very common in the fall in meadows and pastures and lawns. The cap is from five to eleven inches across. The gills or radiating plates beneath the cap are brown when mature. The lower part of the stipe is somewhat enlarged, but no cup occurs. This when eaten by some people is known to produce poisoning and even death.

20. Amanita muscaria, L.

Used to poison flies in Asia.

20a. Amanita phalloides, Fr.

This species is very poisonous and no one should eat so-called mushrooms unless they are familiar with them.

PHALLACEAE.

21. Phallus impudicus, (L.) Fries.

Is the common stinkhorn, probably poisonous, though its disagreeable odor would seem to render it distasteful to animals.

LYCOPERDACEAE.

22. Lycoperdon bovista, L.

The giant puffball is edible in fresh condition, when the flesh is white, but in the mature form is considered poisonous, the same thing applies also to other puffballs.

ASCOMYCETES ASPERGILLACEAE.

23. Eurotium herbariorum (Wigg.) Link.

This fungus is supposed to produce staggers. Frequently found in moldy hay and gives rise to digestive disorders. Mycotic stomatitis.

24. Aspergillus niger, van Tiegham.

This mold also occurs in moldy hay and other moldy substances and like the preceding species is injurious.

25. Aspergillus fumigatus, Fr.

Commonly found on decaying substances, especially moldy hay. It is pathogenic. Found in the ear of man as a parasite.

26. Aspergillus flavus, Link.

HYPOCREACEAE.

27. Claviceps purpurea, Fr.

Found on many different grasses, especially wild rye, cultivated rye, timothy and quack grass. Produces a disease known as ergotism. The fungus is very poisonous, causes dry gangrene and abortion.

FUNGI IMPERFECTI:

28. Oidium albicans, Robin.

Commonly found in the mouth of sucking animals of different kinds, especially calves.

29. Fusarium. Sp.

Commonly found on moldy corn, causes derangement of the digestive organs and in some cases death.

EMBRYOPHYTA ZOIDIOGAMA.

Pteridophyta.

FILICALES.

POLYPODIACEAE.

30. Pteris aquilina, L.

The common brake is found in eastern and northeastern Iowa. Produces a large, strong root-stock. Said to be poisonous to cattle and horses.

31. Aspidium marginale, L.

Of rare occurrence in the state. The root-stock is used as a remedy for the expulsion of tapeworm and undoubtedly sometimes produces poisoning.

OSMUNDACEAE.

32. Osmunda claytoniana, L.

This fern is widely distributed in eastern and northeastern Iowa, occurring as far west as the Des Moines basin. The odor is not pleasant and the plant is undoubtedly more or less poisonous.

EQUISETALES.

EQUISETACEAE.

33. Equisetum arvense, L.

The common horse-tail is supposed to be injurious to horses, so reported in Vermont by Dr. Richman and Professor Jones, and reports of poisoning in other parts of the country are recorded. In Europe it has long been suspected of being poisonous.

34. Equisetum robustum, A. Br.

It is common in the state and, like the preceding, is considered poisonous.

EMBRYOPHYTA SIPHONOGAMA.

Gymnospermae.

CONIFERAE.

TAXACEAE.

35. Taxus canadensis, Willd. American yew.

Found in northeastern Iowa, especially on calcareous rocks and occasionally on sand-stone rock, Linn, Allamakee, and Winneshiek counties. The European species has long been regarded as poisonous to stock. Cases of poisoning

have been reported in this country as well. Toxic substances, one of which is known as *taxine* $C_{37}H_{52}O_{10}N$.

PINACEAE.

36. Juniperus communis, L. Common juniper.

Poisonous, especially the oil obtained from the juniper berries. Rusby and others refer to the poisonous nature of this plant, and Schaffner records that goats are poisoned by eating the leaves. Common only in lime and sandstone rocks in Northeastern Iowa, also Hardin and Linn counties.

37. Juniperus virginiana, L. Red Cedar.

Common in Northeastern and Eastern Iowa, but also widely scattered in the state. The leaves contain the same principle found in the juniper, and according to Schaffner, are poisonous to goats. The oil produces abortion and poisoning has resulted from its use. The oil of Cedar has well known antiseptic properties. An aromatic body cedren $C_{15}H_{24}$, oil of cedar from which cedren-camphor $C_{15}H_{26}O$ has been obtained.

38. Juniperus scopulorum. Sarg.

Commonly cultivated in the state, probably poisonous, like the preceding.

39. Juniperus sabina, L. Swedish juniper.

Occasionally cultivated in the State. Poisonous, like the preceding species.

MONOCOTYLEDONAE.

HELOBIAE. ALISMACEAE.

40. Alisma plantago, L. Water plantain.

Recorded as being poisonous.

41. Sagittaria latifolia, Willd. Large arrow head.

The milky juice is somewhat bitter. The plant is edible, when cooked. The root stocks of several species of the genus are eaten by the Indians and in China.

GLUMIFLORAE. GRAMINEAE.

42. Andropogon sorghum, Brot. Sorghum.

Second growth sorghum has frequently been reported as poisonous to live stock; this is due to the formation of hydrocyanic acid in the wilted leaves.

43. Setaria italica, Kunth. Millet.

Both the German Millet and the Hungarian Grass are poisonous to horses, acting especially on the kidneys. The poisoning is probably due to a glucoside.

44. Stipa spartea Trin. Needle Grass, or Porcupine Grass.

The sharp pointed callus often inflicts serious injuries; the fruits work their way under the cuticle into the flesh of the animals, and in some instances they have even penetrated the intestines.

45. Stipa comata, Trin. Western needle grass.

Somewhat injurious, like the preceding. Only found in N. W. Iowa.

46 Stipa viridula, Trin. Sleepy grass.

This grass has been introduced here and there in the state, and has been suspected of producing stupor in horses. It is doubtful whether this is the one usually referred to in the west as the sleepy grass.

47. Avena sativa, L. Common oats.

The chaff of this grass sometimes produces balls in the stomachs of horses, known as phytobezoars.

48. Avena fatua, L. Wild oats.

Common only in a few counties in northern Iowa. Sometimes causes mechanical injuries on account of the pointed callus of the fruit.

49. Lolium temulentum, L. Darnel.

The grain of this grass is injurious when ground in with flour. It produces stupor and symptoms resembling drunkenness. The poisoning is due to the fungus found in the seed. Principle *loliin* a glucoside.

50. Hordeum vulgare, L.

The chaff and awns of barley are often injurious, especially when coming in contact with the mucous membrane, not only in man, but in lower animals.

51. Hordeum jubatum, L. Squirrel-tail. Wild Barley.

Common throughout the state. This grass produces mechanical injuries in animals that feed on hay containing it, the awns working their way in between the teeth and maxillae. where they cause inflammation and the formation of pus.

52. Agropyron repens, Beauv. Quack grass.

Widely distributed in northern Iowa. Produces a slight irritation of the mucous membrane. Contains *triticin* $C_{12}H_{22}O_{11}$.

LILIIFLORAE. LILACEAE.

53. Zygadenus elegans, Ph. Swamp camas.

Common in northern Iowa. In the western states it is regarded as poisonous to cattle and sheep, occasionally causing death. It is not as poisonous as some of the other species of the genus.

54. Arisaema triphyllum, Torr. Jack-in-the-pulpit.

It is widely distributed in the state. The corm is known to be very acrid and poisonous, but when boiled or roasted the poisonous substance is expelled.

55. Arisaema dracontium, Schott. Dragon's-head.

Widely distributed, especially in eastern and central Iowa. The corm is somewhat acrid. The corm is used to destroy insects, said to be a good vermifuge. The action of the plant in fresh condition is somewhat similar to ammonia.

56. Symplocarpus foetida, (L.) Raf. Skunk Cabbage.

Local only in a very few places. Said to be poisonous, causes vomiting, and temporary blindness. The juice is acrid and the plant has a very disagreeable odor.

57. Melanthium virginicum, L. Bunch-flower.

Common only on low grounds in eastern Iowa. The root stocks are regarded as poisonous, but reports have come to us of the poisonous effect of the leaves and stems on horses, when occurring in hay.

58. Veratrum woodii, Robb. False Hellebore.

Found in Southeastern Iowa. Poisonous like the eastern white Hellebore and the western California Hellebore. Probably contains *jervine* $C_{21}H_{27}NO_3$, and cevadina $C_{32}H_{49}O_9$ and cevadine $C_{27}H_{45}NO_2$.

59. Allium canadense, L. Wild onion.

Widely distributed; common in low pastures. Milk is flavored where cattle feed on the plant.

60. Allium tricoccum, Ait. Wild Leek.

Eastern and northeastern Iowa, seldom west of the Iowa river. Taints milk like the preceding.

61. Lilium superbum, L. Turk's-cap lily.

According to Schaffner, this species produces dermatitis. The bulbs produce mental exhaustion and headache.

62. Asparagus officinalis, L. Asparagus.

According to Dr. White, in his Dermatitis Venenata, persons who constantly work with asparagus may have the skin somewhat blistered.

63. Convallaria majalis, L. Lily-of-the-valley.

All parts of this plant are very poisonous to man and domestic animals. Contains two glucosides, *convallamarin* $C_{46}H_{44}O_{24}$, and *convallarin* $C_{34}H_{31}O_{11}$.

64. Trillium grandiflorum, Salisb. Large flowered Trillium.

This is used as an emetic and contains a principle which has been called trilline, found in a few other species of the genus.

65. Trillium erectum. L. Erect Wake-robin.

The root stock of this species is somewhat poisonous.

66. Smilax rotundifolia, L. Round-leaved Greenbrier.

Widely distributed in the state. Dr. Schaffner reports a case of poisoning from eating the young leaves of these plants. The spines are injurious in a mechanical way; they cause inflammation and pus formation.

IRIDACEAE.

67. Iris versicolor, L. Large Blue-flag.

The underground root stocks of this plant are known to be very poisonous. Dr. Rusby thinks there is some danger "that it might be eaten in mistake for Calamus, which is commonly known as Sweet-flag. If so, it would prove seriously if not fatally poisonous, as its well-known emetico-cathartic properties, even when toned by drying and keeping, are powerful, and in a fresh state would be decidedly violent." It contains the resinous body *iridin*.

MICROSPERMEAE.

ORCHIDACEAE.

68. Cypripedium spectabile, Swz. Showy Moccasin flower.

Produces dermatitis resembling that produced by Poison Ivy. A great many persons are more or less susceptible to this form of dermatitis. Not abundant in Iowa.

69. Cypripedium pubescens, Willd. Yellow Lady-slipper.

Poisonous like the preceding. This species is more widely distributed.

70. Cypripedium candidum, Muhl. Small white Lady-slipper.

Poisonous like the preceding. At one time common in marshes in the state, but rapidly disappearing. Less poisonous than the preceding species.

DICOTYLEDONEAE.

JUGLANDACEAE.

71. Juglans nigra, L. Black Walnut.

It is commonly believed that the bitter principle *Juglandin* found in the fruit and leaves of the black walnut are more or less poisonous, at least it is thought that different species may poison the soil and prevent the growth of other plants; this is, however, not well substantiated. Probably contains *nucin*, an acrid body, causes irritation resembling scarlatina.

URTICALES.

URTICACEAE.

72. Maclura aurantiaca, Nutt. Osage orange.

Cultivated especially in the southern part of the state. The leaves and fruit are more or less poisonous. The thorns upon the plant produce serious injuries giving rise to inflammation.

73. Humulus lupulus, L. Common Hop.

Hop pickers often have an inflammation of the hands. It is a sedative. Hop contains *choline* $C_5H_{15}NO_2$, lupulic acid $C_{32}H_{50}O_7$, oil of humulus $C_{10}H_{16}$ and $C_{10}H_{16}O$.

74. Cannabis sativa, L. Hemp.

Naturalized in many parts of the state. The narcotic effect of the resin of the plant is well known and in India an intoxicating drink is made from the juice of the leaves. Probably it contains the substance *cannabin*, oxycannabine $C_{20}H_{20}N_2O_7$ and cannabine $C_{18}H_{20}$.

75. Urtica dioica, L. Stinging nettle.

The urticating properties of our common nettle are known to all who have had any experience in collecting the plants; there is at first a reddening, followed by a swelling, intense burning, and a small amount of itching. It contains formic acid H_2CO_2.

76. Urtica gracilis, L. Slender nettle.

Injurious, like the preceding. More widely distributed than the preceding.

77. Laportea canadensis, Gaud. Wood nettle.

This plant is even more widely distributed than the preceding nettles. It is found in deep woods. Produces an irritation of the skin like common nettle.

POLYGONALES.

POLYGONACEAE.

78. Rumex acetosella, L. Sheep sorrel.

The plant is widely distributed over the state and is becoming more common. Said to be poisonous to horses and sheep. Contains oxalic acid.

79. Fagopyrum esculentum, Moench. Buckwheat.

A dermatitis produced by the eating of buckwheat cakes is well known to most people and occasionally where screenings of this material are fed in quantities to hogs a similar rash is produced. Buckwheat straw is also considered poisonous. The plant contains the glucoside *indican*.

80. Fagopyrum tartaricum, Gaertn.

Poisonous like the preceding.

81. Polygonum acre, H B K. Smartweed.

The acrid properties of many of the species of Polygonaceae are well known. This species is widely distributed in the state. Contains probably *polygonic acid*.

82. Polygonum hydropiper, L. Smartweed.

Poisonous like the preceding.

CENTROSPERMEAE.

CHENOPODIACEAE.

83. Chenopodium anthelminticum, L. Worm-seed.

Occasionally reported in the state. Cases of poisoning from the oil of the seeds have been reported in medical literature. Contains the volatile oil of worm-seed. This is a narcotico-acrid poison.

84. Chenopodium ambrosioides, L. Mexican Tea.

This species is occasionally reported with properties like the preceding.

PHYTOLACCACEAE.

85. Phytolacca decandra, L. Pokeweed.

The roots and seed contain a very poisonous substance. The young shoots are eaten as greens; probably the poisonous principle is dissipated on boiling the plant. Found only in southern Iowa. Contains *phytolaccine.*

CARYOPHYLLACEAE.

86. Stellaria media, L. Chick-weed.

This has been reported as poisonous, although the seeds are eaten by birds.

87. Agrostemma githago, L. Corn cockle or cockle.

Generally found in wheat fields. Screenings are often sold as stock food and several cases of poisoning from food that contained screenings of cockle have been reported to me. When cockle is in flour, it is poisonous. Several cases of poisoning from flour containing cockle are on record. Cockle is said to be especially poisonous to poultry. Contains the glucoside *saponin* $C_{32}H_{51}O_{18}$ *sapogenin* $C_{14}H_{22}O_2$, and the alkaloid *agrostemmine.*

88. Silene antirrhina, L. Sleepy catchfly.

Very widely distributed in the state. Said to be poisonous.

Silene noctiflora, L. Evening catchfly.

Widely distributed in eastern Iowa. Native to Europe, probably also poisonous.

89. Saponaria officinalis, L. Bouncing Betty.

This plant is said to be somewhat poisonous. Naturalized here and there in the state.

90. Vaccaria vulgaris, Host. Cow cockle.

Common only in grain fields, seeds said to be poisonous, like corn cockle.

RANALES.

NYMPHAEACEAE.

91. Nelumbo lutea, Pers. The American Nelumbo.

Root stocks were used by the Indians for food. It is said to be used to destroy cockroaches according to Schaffner. Roasting dispels the poisonous principle.

RANUNCULACEAE.

92. Hydrastis canadensis, L. Orange Root. Golden Seal.

In northeastern Iowa. Contains *hydrastine* $C_{22}H_{23}NO_6$, *berberina, berberinum* and *xanthopuccina.* Hydrastis causes severe ulceration and cattarhal inflammation.

93. Caltha palustris, L. Marsh marigold.

The leaves of the marsh marigold are eaten, but the poisonous principle is dissipated on boiling. Plant found on low grounds, especially in northern Iowa.

94. Actaea alba, Mill. White baneberry.

More or less poisonous, but generally not eaten by live stock. Found in woods more or less widely distributed in northern Iowa.

95. Actaea rubra, Willd. Red baneberry.

Widely distributed in the state, but never abundant. Berries poisonous.

96. Delphinium consolida, L. Field larkspur.

Naturalized from Europe. Poisonous and fatal to cattle, frequently cultivated as an ornamental plant. It contains several poisonous alkaloids. The alkaloids *delphinine* $C_{22}H_{35}NO_6$, *delphisine* $C_{27}H_{46}N_2O_4$, *delphinoidine* $C_{42}H_{68}N_2O_7$, and *staphisagrine* $C_{22}H_{35}NO_5$ occur in D. Staphisagria and may be looked for in some of our larkspurs.

97. Delphinium carolinianum, Walt. Carolina Larkspur.

Native to prairies, especially gravelly knolls. Reported as fatal to cattle.

98. Delphinium exaltatum, Ait. Tall Larkspur.

Frequently cultivated, native to Europe.

99. Delphinium tricorne, Michx.

Produces fascicled tubefous roots. Common in southern Iowa. Very poisonous to cattle.

100. Aconitum uncinatum, L. Wild Monk's-hood.

Native to a limited area in northeastern Iowa. Contains the substance aconitin. Root, flowers and leaves are poisonous.

101. Anemone nemorosa, L. Wood Anemone.

The common wind flower is said to be a local irritant.

102. Anemone patens, var. Nuttalliana. Gray, Crocus. Sorrel flower. Pasque flower. Wind flower.

This plant is local in central and southern Iowa, but in northern Iowa it is common on gravelly knolls. It is a well known irritant, contains the bitter substance *anemonin* $C_{15}H_{12}O_6$.

103. Clematis virginiana, L. Virgin's-bower.

This plant is widely distributed in the state along with other species of the same genus. The herbage is said to be acrid and caustic. The juice of some species of the genus causes blisters, or even ulcers. The fresh leaves of the *C. erecta* are used as a vesicant in Europe, especially by beggars, hence sometimes called beggar's weed.

104. Ranunculus abortivus, L. Crowfoot.

Common weed in many parts of the state. The leaves are quite acrid; they have a sharp, peppery taste.

105. Ranunculus sceleratus, L. Cursed crowfoot.

A very poisonous species, especially to cattle, since it grows in marshes along with other herbage and is often eaten along with other forage plants. Contains *anemonol* and anemoninic acid.

106. Ranunculus acris, L. Tall buttercup.

Poisonous, causes inflammation when it comes in contact with mucous membrane. Rarely found in the state, but sometimes naturalized.

107. Ranunculus septentrionalis, Poir. Creeping Buttercup.

Widely distributed in low grounds. Acrid like the preceding species.

108. Ranunculus fascicularis, Muhl. Tufted buttercup.

Found only in eastern Iowa, as far west as the Iowa River. Probably poisonous like the preceding species.

ANONACEAE. Custard Apple Family.

109. Asimina triloba, Dunal. Papaw.

It occurs in eastern Iowa as far north as Clinton and Dubuque. The pawpaw is commonly eaten, but a case of poisoning is reported.

BERBERIDACEAE.

110. Berberis aquifolium, Pursh. Trailing Mahonia.

Cultivated. Poisonous. According to Schaffner, the berries are injurious to birds. Probably contains the alkaloids *berberine* $C_{20}H_{17}NO_4$ and oxyacanthine $C_{32}H_{46}N_2O_{11}$, which occurs in the common barberry.

111. Podophyllum peltatum, L. May Apple or Mandrake.

This plant is widely distributed east of the Missouri divide. The roots and leaves are drastic and are known to be poisonous. It is said also that when the leaves are eaten by cows, they produce injurious milk. Dr. Rusby states "a fatal case is recorded in which the evidence is perfectly clear that poisoning resulted from continued large doses administered by an ignorant and careless physician. The poisonous symptoms were all referable to the bowels, those of enteritis. It is also very interesting to note the peculiar effects of poisoning of the external skin by the powder and by the resin of this plant. It produces an ulcer of a very peculiar character, closely resembling one of venereal origin. Serious errors of diagnosis, leading to the gravest injustice to the reputation of the patient, have been known to occur in reference to these cases. A very serious ulcer upon the eye-ball is among these recorded cases." The roots, according to Dr. White, are irritating to the eye, nose, and mouth and skin. Contains picropodophyllin $C_{11}H_8O_2+H_2O$, podophyllotoxin $C_{11}H_1O_2$. The *podophyllin* is a resinous mixture.

MENISPERMACEAE.

112. Menispermum canadense, L. Canadian Moonseed.

This plant is widely distributed in woods in Iowa. According to Dr. Schaffner, contains menispermine, and menispine. A case is reported of the death of three boys from eating the berries in mistake for grapes. The *Cocculus indicus* is a well-known remedy for the destruction of pediculi and is known to be poisonous. It contains *picrotoxin* $C_{30}H_{34}O_{13}$, *cocculin* $C_{19}H_{26}O_{10}$ and an alkaloid *menispermine* $C_{18}H_{24}N_2O_2$.

CALYCANTHACEAE.

113. Calycanthus floridus, L.

Cultivated in Southern Iowa. The aromatic properties of the flowers resemble those of strawberries. This makes it a very desirable cultivated ornamental plant. It contains an active principle *calycanthine*. Chesnut records it as poisonous.

LAURACEAE.

114. Sassafras officinale, Nees. Sassafras.

The berries of this plant are reported to be poisonous, according to Schaffner. This species is found native only in southeastern Iowa.

RHOEDALES. PAPAVERACEAE.

115. Papaver somniferum, L. Opium.

Opium is obtained from the common garden poppy. This species is widely cultivated in the state, and is frequently spontaneous. The more common

alkaloids found in the poppy plant are *morphine* $C_{17}H_{19}NO_3 + H_2O$, *codeine* $C_{18}H_{21}NO_3+H_2O$, and *narcotine* $C_{22}H_{23}NO_7$. The seeds of poppy are sometimes used to spread on top of cookies and bread.

116. Papaver rhoeas, L. Corn Poppy.

This species is occasionally cultivated and sometimes spontaneous; the milky juice contain some poisonous alkaloids, *papaverine* $C_{20}H_{21}NO_4$; codeine $C_{18}H_{21}NO_3$.

117. Papaver dubium, L. Long Smooth-fruited Poppy.

Cultivated; native to Europe, naturalized in Eastern North America.

118. Papaver orientale, L.

This handsome, showy plant is frequently cultivated for ornamental purposes and contains a large amount of milky juice. This plant must be recorded as suspicious.

119. Argemone mexicana, L. Mexican Prickly Poppy.

The Mexican prickly poppy, with pale yellow or yellowish petals, is cultivated in gardens. The latex not only contains narcotic principles, but the prickly pods sometimes cause mechanical injury and set up inflammation. The latex contains morphine.

120. Argemone platyceras, Link & Otto.

This prickly poppy of the plains contains a narcotic substance in its latex. The prickly leaves of the plant cause serious mechanical injury and inflammation.

121. Sanguinaria canadensis, L. Bloodroot.

This widely distributed plant of Eastern North America is well known to nearly everyone. The root is poisonous, contains the principle sanguinarina, found in the red latex. The root is sharply irritating, especially to mucous surfaces. Contains the alkaloid sanguinarine $C_{21}H_{15}NO_4$.

122. Chelidonium majus, L.

Celandine is occasionally cultivated and sometimes spontaneous. The orange-yellow juice or latex is an irritant. The fresh juice produces inflammation and blisters, and it poisons the skin if handled so as to crush the leaves or stem. Contains *chelerythrine* $C_{21}H_{17}NO_4$, with a burning taste, and glaucine $C_{18}H_{19}NO_4$.

CRUCIFERAE.

123. Lepidium sativum, L. Garden Pepper-grass.

Native to Europe, but occasionally escaped from cultivation. The Garden Cress is used as greens. It is a local irritant.

124. Lepidium apetalum, Willd. Small Pepper-grass.

Widely distributed in this state, and like the other pepper-grasses, may produce sinapism.

125. Nasturtium armoracia, Fries. Horse-radish.

This is poisonous, like the preceding species of this order that have been mentioned. Dr. Rusby refers to its irritating properties when taken in excess especially because of its action upon the urinary organs. One case referred to by Dr. Johnson was extreme and serious.

126. Sisymbrium officinale, Scop. Hedge Mustard.

This plant is widely distributed in this state, as a weed. Produces more trouble than mustard.

127. Sisymbrium altissimum, L. Tumbling Mustard.

Weed common in grain fields in the north and may thus find its way into wheat screenings. Such screenings should be fed with caution. Probably produces sinapism, as the other plants of the order. It is also found in this state.

128. Brassica sinapistrum, Boiss. Charlock.

This weed produces sinapism. After the application of the powdered material, there is a sense of burning. The volatile oil of mustard is a powerful irritant, and caustic, and should be used with caution.

SARRACENIALES. SARRACENIACEAE.

129. Sarracenia purpurea, L. Side-Saddle Flower.

Probably not native to the state, although it is found distributed with Drosera in LaCrosse County, Wisconsin, and formerly also in Houston County, Minnesota. The plant contains the substance *sarracenin*. The root produces diuresis, gastric excitation, and an increased, irregular action of the heart. It produces papular eruptions changing to vesicular with depression as in smallpox. The plant was formerly used medicinally by the Indians.

DROSERACEAE.

130. Drosera rotundifolia, L. Sundew.

Sundew is said to be poisonous to cattle. It is not known to be native to the state, although it occurs in Western Wisconsin, north of the Iowa line, and also in Houston County, Minn.

ROSALES. SAXIFRAGACEAE.

131. Sedum acre, L. Stone Crop.

Produces inflammation when applied to the skin of many persons. The juice is acrid and biting.

ROSACEAE.

132. Fragaria vesca, L. European Strawberry.

Found on sand-stone and limestone rocks. Produces irritation of the stomach in some people.

133. Fragaria virginiana, Mill. Wild Virginia Strawberry.

Similar to the preceding.

134. Fragaria chiloensis, Duchesne. Cultivated Strawberry.

Like the preceding. I have known people who could not eat strawberries or pick them without being irritated.

135. Rosa arkansana, Porter. Arkansas Rose.

Widely distributed in the state, especially prairie regions. Not poisonous, but the bristles and prickles often enter the skin and produce serious inflammation.

136. Rosa rubiginosa, L. Sweetbriar.

A frequent escape in pastures. The recurved spines and prickles are injurious like the preceding species.

137. Pyrus aucuparia, Meyer. Mountain Ash.

The berries are poisonous to man, but not to birds. However, they are readily disseminated by birds.

138. Pyrus communis, L. Pear.

Dr. Schaffner states that horses are reported to have been killed by eating rotten pears.

139. Pyrus malus, L. Apple.

The seeds are poisonous; they contain the glucoside which is changed into hydrocyanic acid.

140. Crataegus mollis, L. Haw.

Cases of poisoning are reported by persons eating the fruit of *Crataegus mollis*, probably more on account of the inedible seeds than the fruit.

141. Prunus americana, Marsh. Wild Plum.

The shoots and seeds contain the principle *amygdalin* which is converted into hydrocyanic acid, which is a deadly poisonous substance. The fruit, it should be said, is entirely harmless.

142. Prunus pumila, L. Sand Cherry.

This cherry is not widely distributed in the state, found along the Missouri river and in sandy soil in Eastern Iowa. The fruit is slightly acid and somewhat astringent. Not poisonous, except the wilted leaves and the seeds. The astringent qualities in our wild fruit are undesirable.

143. Prunus pennsylvanica, L. Wild Red Cherry.

Common, especially in the eastern part of the state, and northern as far as Boone and Story Counties. The leaves are poisonous, as well as their seeds. The fruit is edible.

144. Prunus virginiana, L. Choke Cherry.

The leaves and seeds are poisonous. The fruit is astringent, so great is this astringency that it often produces very unpleasant conditions when eaten in any considerable quantity. Choke Cherry is rather widely distributed in the state. The leaves in the wilted condition contain *hydrocyanic* acid HCN.

145. Prunus serotina, Ehrh. Wild Black Cherry.

Most poisonous species in the state. The half wilted leaves are much more poisonous than the fresh leaves, and the seed are very poisonous. The poisonous substance produced is hydrocyanic acid HCN.

146. Amygdalus persica, L. Peach.

The leaves and seeds are poisonous. They contain the substance amygdalin, from which hydrocyanic acid is derived.

LEGUMINOSAE.

147. Cassia chamaecrista, L. Partridge Pea.

Widely distributed in the state, especially on sandy, gravelly soils. There was reported to one of us a case where a great many sheep had the scours; this ailment was attributed to this plant. Many of the species of the genus are known to be laxative.

148. Cassia marylandica, L. Wild or American Senna.

Found in the southeastern part of the state, and probably acts like the preceding.

149. Gymnocladus canadensis, Lam. Kentucky Coffee-tree.

This is widely distributed in the state, especially along the river courses in Eastern Iowa, although growing as far north as Sioux City in the northwestern part of the state, and along the Mississippi into Minnesota. The fruit contains a sweetish, but disagreeable pulp which, as well as the leaves, is poisonous. In the South the leaves are used as fly poison.

PAPILIONACEAE.

15. Baptisia leucantha, T. & G. Large White Wild Indigo.

Widely distributed in prairies of this state, is generally avoided by stock. Two eastern species are regarded as poisonous, being emetics. It is probable that this species must be regarded as suspicious.

151. Crotalaria sagittalis, L. Rattle-box.

This is found in the western part of the state in the Missouri River Bottoms. Produces a disease known as the Missouri Bottom disease, also as crotalism, by Dr. Stalker. The seeds contain an unnamed alkaloid found by Dr. Power. The plant is not only poisonous in the meadow, but also in hay.

152. Lupinus albus, L. Lupine.

The European lupine is occasionally cultivated and in Europe it produces a disease known as lupinosus. Our native species, L. perennis, is also regarded as poisonous. Contains *lupinin* $C_{29}H_{32}O_{16}FH_2O$; *lupinidine* $C_8H_{15}N$; *lupinine* $C_{21}H_{40}N_2O_2$.

153. Melilotus alba, Desv. White Sweet clover.

Widely distributed in the state as a weed. The honey bees collect considerable quantities of honey from the Sweet Clover blossoms. It has been looked upon with suspicion. Dr. Schaffner states that the seeds impart a foul odor to the flour.

154. Melilotus officinalis, Willd. Yellow Sweet Clover.

Also widely distributed in the state. Objectionable like the preceding.

155. Trifolium incarnatum, L. Italian or Crimson Clover.

According to Coville, produces "hair" balls. This plant is occasionally cultivated as a cover crop in this state.

156. Tephrosia virginiana, Pers. Goat's Rue.

Growing only in sandy soil in the eastern part of the state. Used by Indians as a fish poison. Several other species in South America and Mexico have been used in a similar way. One is called *T. toxicaria*, and is a well known fish poison.

157. Robinia pseudacacia, L. Locust-tree. Black locust.

This plant is frequently cultivated in the state, and in numerous places is an escape from cultivation. The roots, leaves and bark are very poisonous to man. Contains robinin $C_{25}H_{20}O_{16}+5\frac{1}{2}H_2O$.

158. Robinia viscosa, Vent. Clammy locust.

Cultivated as an ornamental plant; the roots are somewhat poisonous.

159. Oxytropis lamberti, Pursh. Stemless Loco Weed.

Found in the western part of this state, along the Missouri River and its tributaries, very abundant. One of the conspicuous loco or crazy weeds of the West.

160. Vicia sativa, L. Common Vetch.

A frequent weed in grain fields. The seeds of this are said to be injurious to pigs. It is not injurious to cows. Contains vicine $C_{23}H_{51}N_{11}O_{21}$.

161. Phaseolus lunatus, Linn. Lima bean.

Investigations carried on in Europe seem to indicate that the lima bean leaves in the wilted condition contain hydrocyanic acid. According to Guignard practically all varieties, whether wild or cultivated, were found to contain a principle which when acted upon by an enzyme yields hydrocyanic cacid. Pro-

longed boiling, however, extracts the greater part of it, but it is not destroyed, consequently this water should not be used, as it contains the substance which is converted into hydrocyanic acid.

GERANIALES. OXALIDACEAE.

162. Oxalis violacea, L. Wood Sorrel.

Dr. Schaffner reports a case of a boy who was poisoned from eating a considerable quantity of the leaves. The leaves are frequently eaten.

LINACEAE.

163. Linum usitatissimum, L. Flax.

Said to produce death to cattle, probably due to the formation of hydrocyanic acid in the wilted leaves. People working with the fiber of the plant often have a form of dermatitis. The Flax-seed, when fed in considerable quantities to live stock, especially hogs, produces death. The *Linum catharticum* contains a bitter principle *linin*, and *linamarin*.

164. Linum rigidum, Pursh. Large-flowered Yellow Flax.

This plant is reported as poisonous to sheep in some parts of the country. Found in the western part of the State.

SIMARUBACEAE.

165. Ailanthus glandulosa, Desf. Tree-of-Heaven.

This plant is occasionally spontaneous in the southeastern part of the State, where it is cultivated as an ornamental plant. It is supposed to produce poisoning when people come in contact with it. The odor of the flowers is very disagreeable. It is said also, according to Dr. Rusby, that the water coming in contact with the leaves is poisonous.

POLYGALACEAE.

166. Polygala senega, L. Seneca Snakeroot.

The roots of this plant are used in medicine as an emetic. The plant is common in the Eastern part of the state.

EUPHORBIACEAE.

167. Croton capitatus, Michx. Hogwort, Croton.

Native to Southeastern Iowa. Many species of the genus contain very active poisonous principles. While this plant has not been suspected, the related species, *C. texensis*, is known to be poisonous.

168. Ricinus communis, L. Castor-Oil Plant.

Widely cultivated as an ornamental plant. The seeds contain a deadly poisonous substance *ricin*.

169. Euphorbia corollata, L. Flowering Spurge.

Widely distributed in the state, upon sandy or gravelly soil. Produces inflammation of the skin.

170. Euphorbia preslii, Guss. Spurge.

Widely distributed in meadows and fields. It has been sent to the writer as supposedly poisonous to live stock.

171. Euphorbia marginata, Pursh. Snow-on-the-Mountain.

The honey coming from the plant is poisonous. The milky juice produces dermatitis. At one time the plant was used for branding cattle.

172. Euphorbia lathyris, L. Caper or Myrtle Spurge.

Native to Europe, occasionally cultivated. The seeds of this plant are poisonous. The Euphorbia resinifera contains *euphorbon* $C_{13}H_{22}O$.

173. Euphorbia cyparissias, L. Cypress Spurge.

Frequently escaped from cultivation, especially near cemeteries. Poiosnous to the skin, produces a dermatitis.

SAPINDALES. ANACARDIACEAE.

174. Rhus toxicodendron, L. Poison Ivy.

The leaves and stems are poisonous to many people. The form of dermatitis produced, and the seriousness of the case varies according to the susceptibility of the individual. The plant is widely distributed in the state.

CELASTRACEAE.

175. Celastrus scandens, L. Climbing Bittersweet.

The aril is red and has a somewhat disagreeable, sweetish taste. The leaves are said to be poisonous to horses. Bittersweet is quite widely ditributed in Iowa.

HIPPOCASTANACEAE.

176. Aesculus hippocastanum, L. Horse-Chestnut.

The seed of this species has long been recognized as poisonous in Europe. Frequently cultivated in the state, especially Southern Iowa. The glucosides *aesculin* $C_{15}H_{16}O_9 1\frac{1}{2}H_2O$, *argyraescin* $C_{27}H_{42}O_{12}$.

177. Aesculus glabra, Willd. Ohio Buckeye.

Found in Southern Iowa, along river courses as far north as Fort Dodge. Cases of poisoning have been reported to one of us, especially where cattle eat the young shoots and seeds of the plant.

BALSAMINACEAE.

178. Impatiens fulva, Nutt. Spotted Touch-me-not.

Widely distributed in the state, especially low grounds. The leaves are acrid. The plant is suspected of being poisonous to live stock.

RHAMNALES. RHAMNACEAE.

179. Rhamnus cathartica, L. Buckthorn.

Frequently cultivated. Used as a hedge plant. Chiefly in Eastern and Southeastern Iowa. Ripe fruit is said to be poisonous. Contains the glucosides *rhamnin* $C_{23}H_{28}O_{14}$, *rhamnetin* $C_{23}H_{16}O_{11}$ and *rhamno-cathartin*.

180. Rhamnus lanceolata, Pursh. Buckthorn.

Native to southern Iowa, occurs as far north as Boone County. Has the same properties as the preceding species.

VITACEAE.

181. Ampelopsis quinquefolia, Michx. Virginia Creeper.

The fruit is looked upon with suspicion by some people, but there are no records of poisoning, so far as we know.

MALVALES. MALVACEAE.

182. Abutilon avicennae, Gaertn. Velvet-Leaf. Indian Mallow. Butter Print.

Widely naturalized in the state. The plant gives off a very disagreeable odor, and is suspected of being poisonous.

PARIETALES. HYPERICACEAE.

183. Hypericum maculatum, Walt. Spotted St. John's-Wort.
All the species are suspected of being poisonous to horses.
184. Hypericum perforatum, L. Common St. John's-Wort.
Naturalized here and there in Eastern Iowa.
185. Hypericum ascyron, L. Great St. John's-Wort.
Most widely distributed species in the state, woods or borders of woods.

VIOLACEAE.

186. Viola odorata, L. Sweet Violet.
Commonly cultivated in greenhouses. Said to be somewhat poisonous. Underground parts of the plant are emetic.
187. Viola cucullata, Ait. Common Blue Violet.
The most widely distributed species in the states. The roots, like the preceding, are emetic.

LOASACEAE.

188. Mentzelia ornata, Torr. & Gray. Mentzelia.
The backwardly barbed trichomes sometimes produce mechanical injuries. Found in Northwestern Iowa on the Big Sioux near Sioux City.

OPUNTIALES. CACTACEAE.

189. Opuntia rafinesquii, Engelm. Cactus.
Found in sandy soil in the state. The barbed trichomes cause mechanical injuries.

MYRTIFLORAE. THYMELACEAE.

190. Daphne mezereum, L. Spurge Laurel.
This is a well known poisonous plant of Europe. It is occasionally cultivated in the state. Contains the glucosides *daphnin* $C_{30}H_{34}O_{19}$, *daphnetin* $2(C_9H_6O_4)$ H_2O, *coccognin* $C_{20}H_{22}O_8$.
191. Dirca palustris, L. Leather-Wood. Moose-Wood.
Found in Northeastern Iowa, Hardin and in Dallas Counties. The bark is acrid, the berries are narcotic and poisonous.

UMBELLIFLORAE. ARALIACEAE.

192. Aralia spinosa, L. Hercules' Club.
Occasionally cultivated. Produces mechanical injury by irritating the skin.

UMBELLIFERAE.

193. Conium maculatum, L. Poison Hemlock.
Probably introduced here and there in the state. The plant contains the alkaloids *coniine* $C_8H_{17}N$, *conydrine* $C_8H_{17}NO$, *menthylconiine* $C_9H_{17}N$, a bitter principle *cicutoxin*. A very poisonous plant both to man and lower animals.
194. Petroselinum sativum. Parsley.
Some people are suspicious of parsley. Dr. Schaffner states that the seeds are injurious to birds. He reports a case of poisoning of several parrots from eating the leaves of this plant.
195. Apium graveolens, L. Celery.

I know of several cases where persons who have handled celery have had a form of dermatitis. Some persons cannot eat celery because a rash forms.

196. Cicuta maculata, L. Water hemlock.

The roots of this plant are very poisonous. The plant is widely distributed in the state, especially in low grounds in northern Iowa. The European cowbane, *C. virosa*, contains the alkaloid *coniine* $C_8H_{17}N$, a substance which probably also occurs in our plant.

197. Cicuta bulbifera, L. Bulb-bearing Hemlock.

The roots of this, and the whole plant are supposed to be very poisonous. Occasionally found in swamps in northern Iowa.

198. Sium cicutaefolium, Gmelin. Water Parsnip.

Common in many parts of the state in low grounds. Said to be poisonous.

199. Aethusa cynapium, L. Fool's Parsley.

A poisonous herb native to Europe, with a disagreeable odor. Possibly occurs in a few places in the state. Contains the alkaloid *synapine* and another coniine like alkaloid.

200. Angelica atropurpurea, L. Purple-stemmed Angelica.

Found in low grounds in North and Northeastern Iowa. Possibly poisonous. Cattle do not relish it.

201. Tiedemannia rigida, Coult. & Rose. Cowbane.

The roots are tuberous and poisonous. It grows in swamps.

202. Pastinaca sativa, L. Parsnip.

Persons are often poisoned by handling the plant, which causes inflammation and vesication. Mr. F. C. Stewart, in a letter to the writer, made the following statement: "Henry Van Dresser, a prominent lecturer on poultry in this state, New York, had a very serious injury to his face and eyes. His face became badly swollen and his eyes were in a terrible condition. It was feared at the time that they would be ruined, but the sight was not lost, although it was considerably impaired. The physician in charge diagnosed it as a case of poisoning, due probably to the flowers of wild parsnip. Very shortly before the trouble appeared Mr. Van Dresser had been mowing a large patch of wild parsnip which was in bloom. It was a hot day, so that he perspired profusely. He gathered bunches of the wild parsnip plants in his arms and carried them. This brought the plants in contact with his face. Both Mr. Van Dresser and the physician feel confident that the wild parsnip was the cause of the trouble. Another gentleman who had heard of this case told me that some years ago he lost a little girl with poisoning of a somewhat similar character, and it was attributed to the parsnip blossoms, among which the little girl had been playing immediately before the attack." The roots are not poisonous.

203. Heracleum lanatum, Michx. Cow-Parsnip.

Supposedly poisonous, although the leaves of the fresh plant are eaten by the Indians. The species is widely distributed in the state, especially in rich woods. Contains the bitter principle *heraclin* $C_{32}H_{22}O_{10}$.

204. Daucus carota, L. Carrot.

The carrot, like the parsnip, causes vesication. Dr. Schaffner says that persons handling the plant are often poisoned, especially when the plant is wet with dew.

CORNACEAE.

205. Cornus paniculata, L'Her. Dogwood.

Widely distributed in the state.

206. Cornus candidissima, Marsh.

The fruits of this species are considered by some people to be poisonous, but there are no authentic cases.

Metachlamydeae (Sympetalae).

ERICALES. ERICACEAE.

207. Epigaea repens, L. Trailing Arbutus.

Reported from a limited area in Northeastern Iowa. Supposed to be poisonous. Contains the glucoside *ericolin* $C_{31}H_{56}O_{21}$.

PRIMULALES. PRIMULACEAE.

208. Anagallis arvensis, L. Poor Man's or Shepherd's Weather Grass.

Possibly growing in the state. Known to be poisonous. Contains the glucoside *cyclamin* $C_{20}H_{34}O_{10}$.

CONTORTAE. OLEACEAE.

209. Ligustrum vulgare, L. Privet.

The privet is occasionally cultivated in the state, especially in Southern Iowa. The leaves and fruit of the plant are said to be poisonous. Prof. Chesnut says that accidents have been occasioned in children, both by fruit and the leaves. Contains the bitter principle *syringopicrin* $C_{28}H_{24}O_{17}$.

MENYANTHACEAE.

210. Menyanthes trifoliata, L. Buckbean.

The plant has bitter properties and is nauseous. Contains *menyanthin* $C_{30}H_{46}O_{14}$.

APOCYNACEAE.

211. Apocynum androsaemifolium, L. Spreading Dogbane.

Widely distributed in the state, probably poisonous.

212. Apocynum cannabinum, L. Indian Hemp.

Like the preceding. Contains *apocynin*, which is poisonous.

213. Nereum oleander, L. Common Oleander.

Cultivated. The leaves, stems and flowers are poisonous. The honey from the oleander flower is poisonous. The leaves are deadly poisonous to stock. Contains *conessine* $C_{12}H_{20}N$, *neriin*, which has the properties of digitalein, nerianthin bears a resemblance to digitalin.

ASCLEPIADACEAE.

214. Asclepias tuberosa, L. Pleurisy-Root.

Widely distributed in the state, especially on gravelly knolls and prairies. The leaves are more or less poisonous to stock. However, honey bees collect considerable honey from this plant.

215. Asclepias incarnata, L. Swamp Milkweed.

Poisonous, probably, like the preceding. The root is emetic and cathartic.

216. Asclepias syriaca, L. Milkweed.

Poisonous. Contains the glucoside *asclepione*, an amorphous bitter substance.

217. Asclepias speciosa, Torr. Showy Milkweed.

Poisonous. This species is found in Western and Northwestern Iowa.

TUBIFLORAE. CONVOLVULACEAE.

218. Ipomoea pandurata, Meyer. Wild Potato Vine. Man of the Earth.

The large root is poisonous. Contains the glucoside *ipomoein* $C_{18}D_{132}O_{58}$.

219. Convolvulus sepium, L. Hedge Bindweed.

The plant produces a somewhat disagreeable odor. Dr. Schaffner states that it is supposedly poisonous to swine. Jalap contains several glucosides. The same probably occur in our Morning Glory. One is *convolvulin*, $C_{31}H_{50}O_{16}$.

BORRAGINACEAE.

220. Cynoglossum officinale, L. Hound's-Tongue.

Probably poisonous.

221. Cynoglossum virginicum, L. Wild Comfrey.

Supposed to be poisonous.

222. Lappula officinalis, Lehm. Stickweed.

The fruit of this plant gets into the wool and sometimes produces mechanical injuries.

223. Echium vulgare, L. Viper's Bugloss.

Occasionally spontaneous, probably in the Eastern part of the state.

LABIATAE.

224. Nepeta glechoma, Benth. Ground Ivy.

Widely naturalized in the state. Is said to be poisonous to horses.

225. Hedeoma pulegioides, Pers. Pennyroyal.

Common, especially in clay soils in Eastern Iowa. The oil is known to cause poisoning.

226. Leonurus cardiaca, L. Common Motherwort.

Known to produce mechanical injuries and dermatitis. Widely distributed in this state, naturalized in Europe.

SOLANACEAE.

227. Nicandra physaloides, Gaertn. Apple of Peru.

Cultivated here and there in the state. Said to be poisonous. Used as a fly poison in parts of the United States.

228. Solanum nigrum, L. Black Nightshade.

The leaves and other parts of the plant are reputed to be poisonous to calves, sheep, goats, swine, and the green berries are known to be poisonous to man. The fruit of a form of this species is cultivated as an esculent. The writer has not only eaten berries of this, but has seen others eat berries of this and the common Black Nightshade. Contains the alkaloid *solanine* $C_{42}H_{75}NO_{15}$, with a hot, bitter taste.

229. Solanum tuberosum, L. Potato.

At certain times the tubers of the potato are poisonous, especially when green. The writer knows of an instance where the eating of potatoes acted as a poison. The substances produced in the young shoots of the potatoes are *solanine* and *solanidine* $C_{40}H_{61}NO_2$.

230. Solanum carolinense, L. Horse-nettle.

Naturalized in Southern part of the state, and more or less widely distributed in Eastern Iowa. The fruit has a very disagreeable odor, and the plant as well as the fruit is narcotic.

231. Solanum dulcamara, L. Bittersweet.

The berries are poisonous, as are also the leaves. Cattle are known to have been poisoned by it. The bitter substance contained in it is known as *dulcamarin.*

232. Nicotiana tabacum, L. Tobacco.

Cultivated in different parts of the state, but not extensively. Narcotic and poisonous, and produces the alkaloid nicotine $C_{10}H_{14}N_2$, a very poisonous substance.

233. Nicotiana alatum, Link & Otto. Flowering Tobacco.

Poisonous like the preceding.

234. Hyoscyamus niger, L. Black Henbane.

Probably occasionally found in the state. Known to be poisonous to stock and also to hogs. Universally recognized as a poisonous plant in Europe and this country. Probably one of the most deadly poisonous plants in the United States. Seeds are poisonous to chickens. Contains the alkaloid *hyoscyamine* $C_{17}H_{23}NO_3$.

235. Datura stramonium, L. Jimson-weed.

Naturalized in various parts of the state. All parts of the plant are narcotic and poisonous, especially the seed. Several cases of poisoning in children are reported in the state. The plant produces a very disagreeable odor, and the hay containing the plant is poisonous to cattle. It contains the alkaloid *atropine* $C_{17}H_{23}NO_3$, *hyoscyamine*, and *stramonine.*

236. Datura tatula, L. Purple Jimspon-weed.

Poisonous, like the preceding, and the following species. Naturalized in different parts of the state.

237. Datura wrightii, DC. Wright's Datura.

Frequently cultivated as an ornamental plant, is known to be poisonous. The nectar from the flower which is produced in great abundance is known to produce poisoning to children in this state.

238. Capsicum annuum, L. Red or Cayenne Peppers.

Well known remedy used as a stimulating plaster externally, if the pepper is applied long enough it produces vesicles. Red pepper is often injurious when taken in too large doses internally. The active poison is *capsicol* $C_9H_{14}NO_2$, with a strong odor and burning taste.

239. Verbascum thapsus, L. Common Mullein.

Widely distributed in this state, occurring in rather dry, sterile soil, a weed introduced from Europe. This species is said to produce dermatitis.

240. Scrophularia marylandica, Gray. Simpson Honey Plant.

Widely distributed in the state, pastures and woods. Not eaten by stock. According to Millspaugh, the physiological effect of this plant is bleeding of the gums, colic, and sleepiness. Contains a crystalline bitter substance, *scrophularin.*

241. Digitalis purpurea, L. Purple Foxglove.

This plant is widely cultivated in the state and is poisonous to man and

live stock, especially horses. It contains the glucoside *digitalin* $C_{49}H_{78}O_{30}$ which dilates the pupil. *Digitoxin, digitonin* $C_{31}H_{52}O_{17}$. *Digitalein.*

242. Gerardia tenuifolia, Vahl. Slender Gerardia.

Said to be poisonous to sheep and calves. Probably other species are likewise poisonous, like *G. grandiflora* and *G. purpurea.*

243. Pedicularis lanceolata, Mx. Lousewort.

Widely distributed in low grounds and swamps. Said to be poisonous.

244. Pedicularis canadensis, L. Lousewort.

Widely distributed in the state, gravelly soils and knolls. Said to be poisonous. Sheep, however, eat large quantities of the *P. groenlandica* without apparent injuries.

BIGNONIACEAE.

245. Catalpa speciosa, Warder. Hardy Catalpa.

Widely distributed in the state, odor coming from the fragrant flowers is poisonous and Dr. White in his Dermititis Venenata states that the flowers are irritating to many persons. Dr. Millspaugh, on the other hand, makes a statement that it is said to be dangerous to inhale the odor of the flowers for a long time, which, however, is probably not generally true. The allied Caroba contains the bitter principle *carobin.*

246. Catalpa bignonioides, Walt. Common Catalpa.

Occasionally cultivated in the state, but scarcely hardy. Poisonous like the preceding.

RUBIALES. RUBIACEAE.

247. Cephalanthus occidentalis, L. Buttonbush.

This plant commonly occurs in low grounds, especially along river courses. The leaves contain a poisonous principle. Contains cephalanthin $C_{22}H_{34}O_6$, a very bitter glucoside.

CAPRIFOLIACEAE.

248. Triosteum perfoliatum, L. Feverwort, Horse-gentian.

Widely distributed in woods. Some species of the genus were used by the Indians as a cure for fevers and early practitioners in this country used the root as an emetic. In the early days the berries of this plant were used as a substitute for coffee. The physiological action of the plant is to produce vomiting.

249. Sambucus canadensis, L. Elderberry.

Dr. Rusby states that the plant is poisonous. The elderberry is widely distributed in the state and the flowers of this are commonly used to prepare a tea.

250. Symphoricarpos vulgaris, Michx. Coral-berry.

Common in southern Iowa, occurring on sterile or rocky soils and on borders of woods.

CAMPANULATAE. CAMPANULACEAE.

251. Lobelia cardinalis, L. Cardinal-flower.

This is listed as one of the poisonous plants by Dr. Schaffner. Cardinal-flower is very abundant in the swamps along river courses in Eastern Iowa, less common in Central Iowa.

252. Lobelia syphilitica, L. Blue Lobelia.

Also listed as a poisonous plant by Dr. Schaffner.

253. Lobelia spicata, Lam. Pale Spiked Lobelia.

Everywhere on prairies throughout the state. Probably poisonous like the preceding.

254. Lobelia inflata, L. Indian Tobacco.

Widely distributed, occurring in woods. The leaves of this plant were used by the Indians. The plant has long been used in medicine. *Lobelia inflata* is very poisonous, used for its action upon the pneumogastric nerve and the toxic doses produce exhaustion, dilation of the pupils. Death is usually preceded by insensibility and convulsions. Contains the acrid *lobeliine.*

255. Lobelia kalmii, L. Kalm's Lobelia.

Found only in swamps in northern Iowa. Probably poisonous like the preceding.

COMPOSITAE.

256. Cichorium intybus, L. Chicory.

Has become widely naturalized in parts of the state. When fed in large quantities to dairy cattle it imparts a bitter flavor to the milk and butter. The bitter glucoside *chicorin* $C_{32}H_{34}O_{19}+4\frac{1}{2}H_2O$.

257. Ambrosia artemisiaefolia, L. Common Ragweed.

The pollen of this plant is suspected of causing hay-fever.

258. Ambrosia trifida, L. Great Ragweed.

The pollen of this species is said to produce an irritating action upon the mucous membrane.

259. Xanthium canadense, Mill. Cocklebur.

Young seedlings of this plant are poisonous to horses. Several cases of poisoning to hogs have been reported in this state.

260. Xanthium strumarium, L. Cocklebur.

Poisonous like the preceding. This species is not common in the state. Contains the glucoside *xanthostrumarin.*

261. Eupatorium perfoliatum, L. Boneset.

Commonly found in low grounds and marshes. Emetic in large doses.

262. Eupatorium ageratoides, L. White Snake-root.

Widely distributed in woods in this state. It is said to produce a disease known as milk fever. No reports of this kind of poisoning have come to the writers in this state. The *E. cannabinum* contains the alkaloid *eupatorine* $C_{20}H_{25}O_{36}HNO_3$ and the glucoside *eupatorin.*

263. Erigeron canadensis, L. Horse Weed.

Widely distributed troublesome weed in the state. The physiological action of the drug obtained from this plant is to produce smarting of the eyes, soreness of the throat, and prostration.

264. Solidago canadensis, L. Golden-rod.

Widely distributed in the state, one of the most common of our golden-rods. The golden-rods are generally regarded as harmless plants, but in a few cases they are suspected of being poisonous. A disease of horses near Black River Falls, Wisconsin, was attributed to a golden-rod. Chesnut thinks the disease due to a rust on the plant. As a general thing stock does not relish the golden-rod.

265. Rudbeckia laciniata, L. Cone-flower.

In moist grounds throughout the state. Dr. Schaffner says it is supposed to be poisonous to sheep.

266. Bidens frondosa, L. Black Beggar-ticks.

Common in the state. The downwardly barbed awns are irritating.

267. Coreopsis discoidea, T. & G. Small Beggar-ticks.

Very common in the state. Is a local irritant.

268. Helenium autumnale, L. Sneezeweed.

Common in low grounds throughout the state. Used by the Indians to produce sneezing. The whole plant and flowers are poisonous to cattle and sheep.

269. Achillea millefolium, L. Yarrow.

Used as a forage plant, but it causes an irritating sensation of the membranes and much pain in the gastric and abdominal regions. It contains the glucoside *achillein* $C_2H_{38}N_2O_{15}$, an amorphous bitter substance, the alkaloid moschatine $C_{21}H_{27}NO_7$.

270. Anthemis cotula, L. Mayweed.

Has a very disagreeable odor, causes blistering of the skin. The plant is carefully avoided by stock.

271. Dysodia chrysanthemoides, Lag. Fetid Marigold.

Common in the western part of the state. The leaf bracts and other parts of the plant are provided with large pellucid glands which produce the characteristic odor of the plant.

272. Tanacetum vulgare, L. Common Tansy.

Introduced into many parts of the state. Many serious and a few fatal cases of poisoning are recorded by the use of tansy oil. The symptoms of poisoning are varied, convulsions, violent spasms, dilation of the pupils, frequent and feeble pulse. Eleven drachms of the oil in a girl produced death in three and one-half hours. The effect on animals is salivation, vomiting, dilation of the pupils, muscular twitchings, followed by chronic spasms, death appears to be caused by paralysis of the heart and lungs.

273. Artemisia biennis, Willd. Biennial Wormwood.

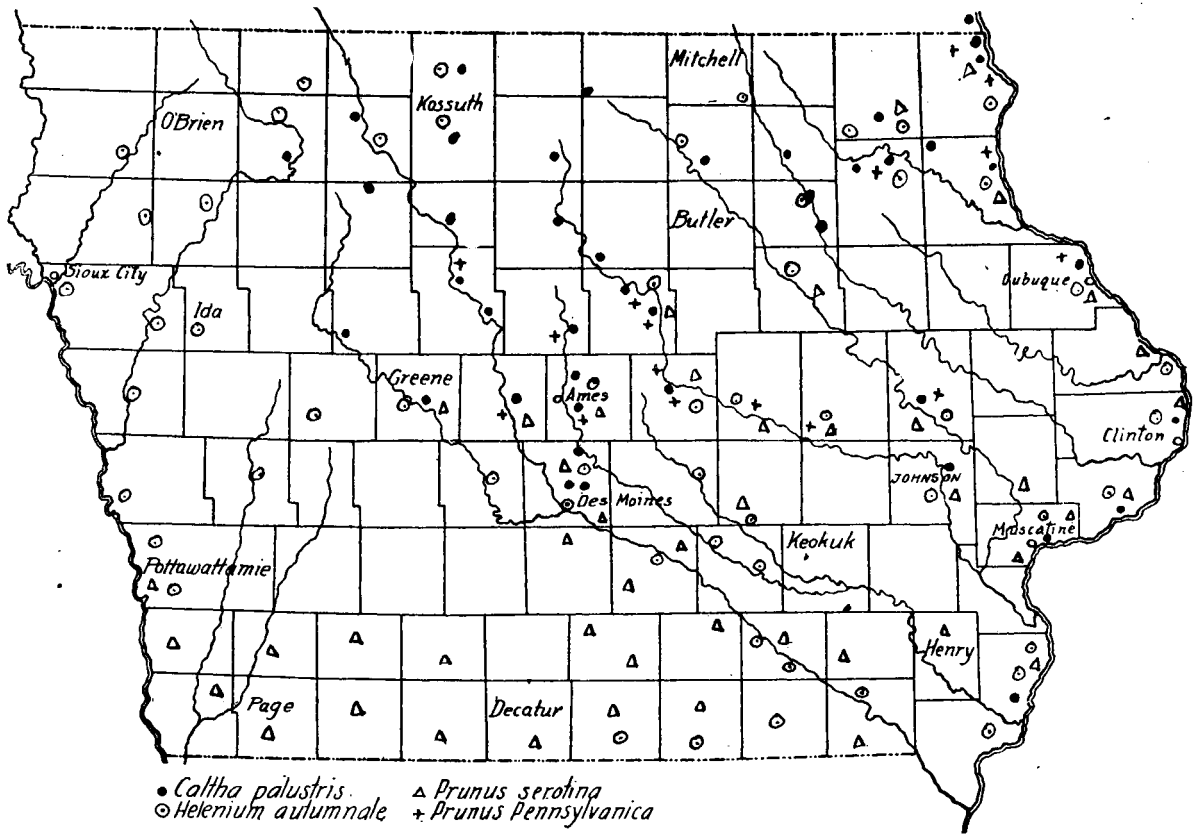
Probably poisonous.

274. Artemisia absinthium, L. Common Wormwood.

Occasionally cultivated. The volatile oil of the plant is a violent, narcotic poison. Contains the glucoside *absynthiin* $C_{15}H_{20}O_4$, the alkaloid *abrotine* $C_{21}H_{22}N_2O_2$, the bitter principle *santonin* $C_{15}H_{18}O_3$.

275. Arctium lappa, L. Burdock.

Produces itching. Contains the alkaloid lappine. Common weed in the state.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• Caltha palustris
⊙ Helenium autumnale
△ Prunus serotina
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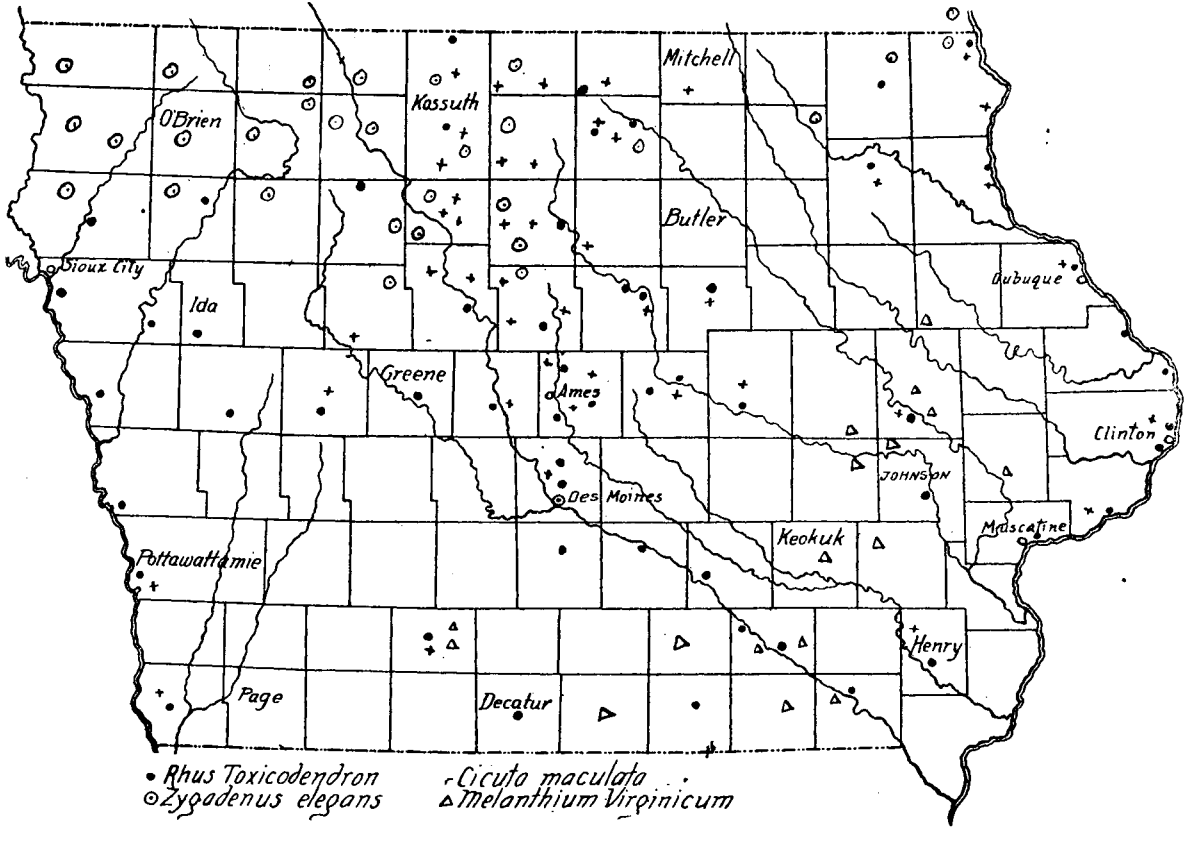
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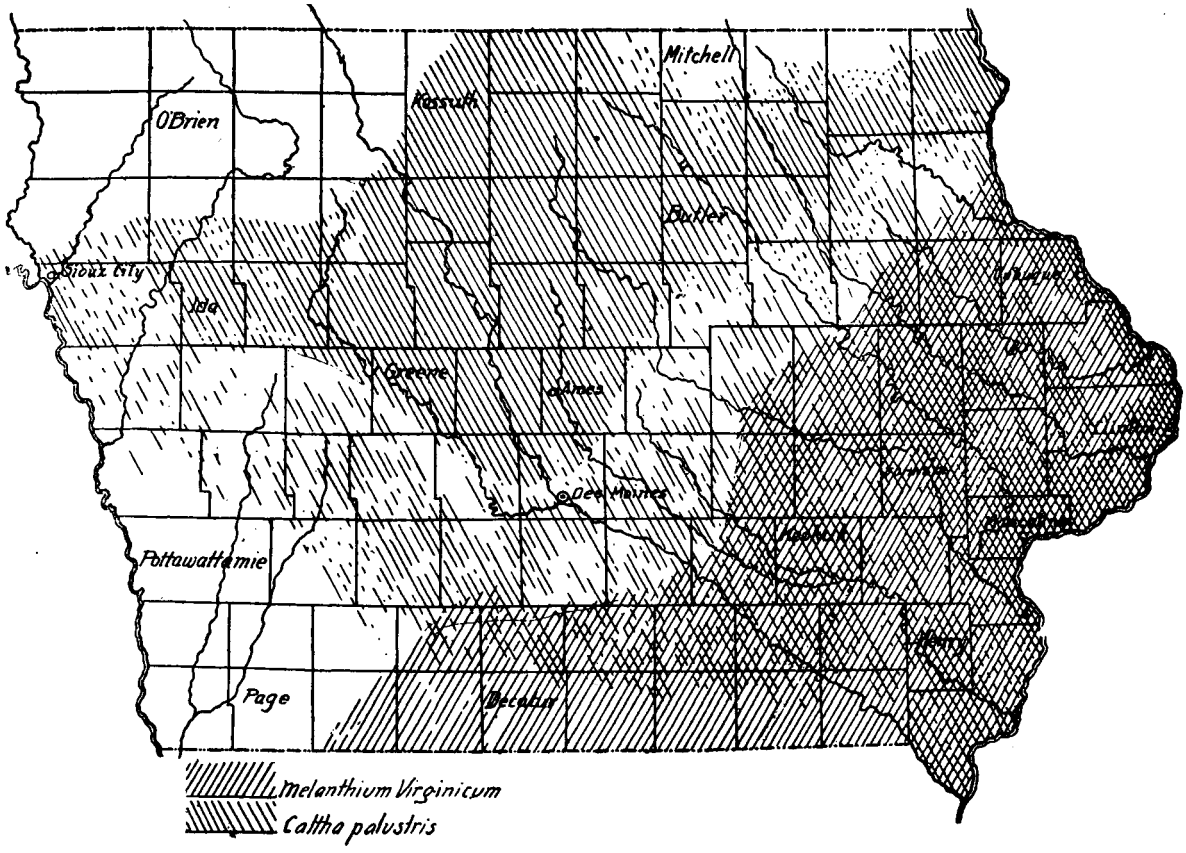
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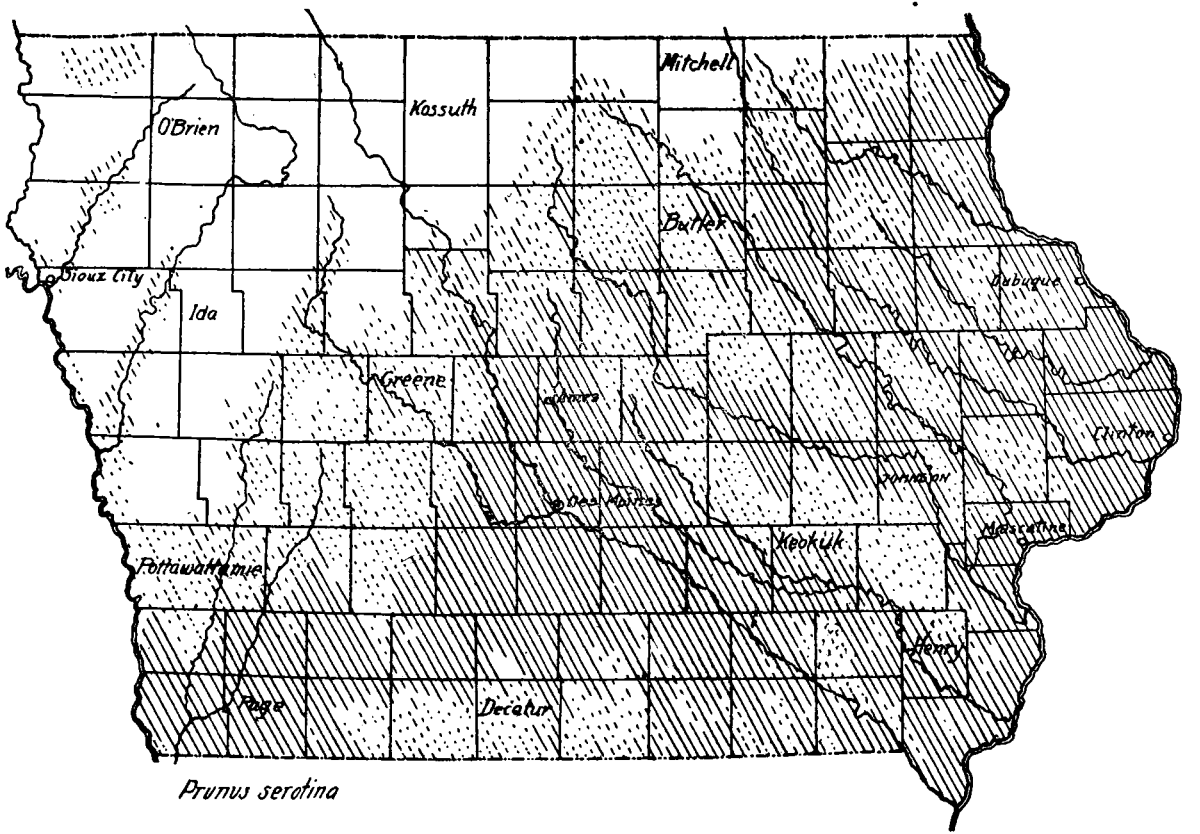
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